CITY OF SCOTTSDALE
PLANNING & DEVELOPMENT SERVICES DEPARTMENT

INTERPRETATIONS & APPLICATIONS OF BUILDING CODES & REGULATIONS #96-6

CODE SECTION : IBC

08/06/96 rev. 9/16/2003 rev. 10/29/2007

SUBJECT : BASIC REVIEW ASSUMPTIONS AND REQUIREMENTS FOR RETAINING WALLS

Following is not to be used for review of flood walls, culvert walls, head walls, and containment walls

A. The following soil parameters shall be used in review of all retaining walls (except flood walls), unless a soil report for the site is submitted. Soil parameters shown below are higher than values provided in IBC table 1804.2. for class 4 soil, which is typical of soil found in the Scottsdale area.

1. Soil density.....110 pcf
2. Active pressure.....30 pcf
3. Active pressure for restrained walls.....55 pcf
4. Passive pressure.....250 pcf, 750 pcf max.
5. Base friction coefficient:
   When passive force is utilized.....0.25
   Independent of passive force.....0.40
6. Allowable bearing pressure.....1500 psf. A 133% increase in bearing pressure at toe is allowed in conjunction with wind and seismic loads when the Alternative Basic Load Combinations (2006 IBC Sec. 1605.3.2) are used or when allowed per the soils report.

Footings shall bear minimum of 18" below undisturbed soil or engineer certified fill.

7. Top 12" of soil at toe side shall not be used in calculating passive force and where horizontal distance from face of footing to slope of grade is less than 1/3 of retaining wall height, passive force shall not be used to provide support for retaining wall. In addition passive force shall not be used where soil at toe side is not compacted per soils report recommendations.

8. Minimum temperature reinforcing per ACI-318, Section 10.5.3 and 7.12 shall be provided at footing, but in no case shall be less than .0018 x gross concrete area.

B. Surcharge at driveways or adjacent to roadways: 2 feet of added depth of fill as recommended by AASHTO or actual loads as calculated by the engineer.

C. Safety factors (IBC 1806)

Overturning.....1.5
Sliding.....1.5

D. Wind load (2006 IBC Sec. 1609.1.1 references ASCE 7 for calculating wind loads):

1. Effects of windload shall be considered in design of retaining wall structure.
2. ASCE 7-05 Sec. 6.5.14 shall be used to determine wind load on all walls.
3. Use wind exposure C unless approved by Scottsdale Planning & Development Services.
4. Wall height shall be measured from top of footing for determining windloads.

E. When elevation drop at retaining walls exceeds 30" in a habitable area, a 6'-0" solid fence wall will be considered on top of retaining wall in review of the retaining walls unless otherwise is shown by the applicant and approved by Scottsdale Development Services.

F. Retaining wall design calculations are required where retaining height at heel exceeds 4'-0" from bottom of footing to finished grade. Design calculations are required where surcharge is present, and/or retaining wall is supporting solid fence wall.

G. Positive drainage shall be provided at all retaining walls. Where weep holes are utilized use minimum 2" diameter pipe at 6'-0" spacing maximum, and provide continuous gravel pocket behind retaining wall, wrapped in geo-fab to prevent clogging of pipes. Where perforated pipes are used, pipe shall be wrapped in geo-fab and placed in a continuous gravel bedding. Site plan shall show location of daylight for the pipe.

H. Where retaining wall footings are within 10 feet of the edge of high water elevation at retention basins or channels, a letter from a soils engineer shall accompany plans and detail additional requirements. The letter shall address over-saturation and settlement and minimum embedment of bottom of footing.

I. All retaining wall calculations shall be accompanied by a civil site plan. Retaining wall construction details and specifications shall be placed on 24"x36" drawing, and where schedules are used, each elevation of wall shall be keyed to the schedule and the start and end of retaining walls shall be shown on civil site plan. All other existing structures including, buildings, driveways, walkways, hardscapes, barbecues, swimming pools, gazebos, landscape elements, etc., shall be shown on site plans. Landscape elements shall include boulders, earth piles, trees, etc.

J. Refer to Civil Plan Review requirements and Planning Review requirements for additional site specific items that may be needed on your plan.

K. All forces on structures are calculated using fundamentals per "Soil Engineering, 3rd edition" by Spangler and Handy (or any other generally approved reference submitted by the designer), and 2006 IBC.